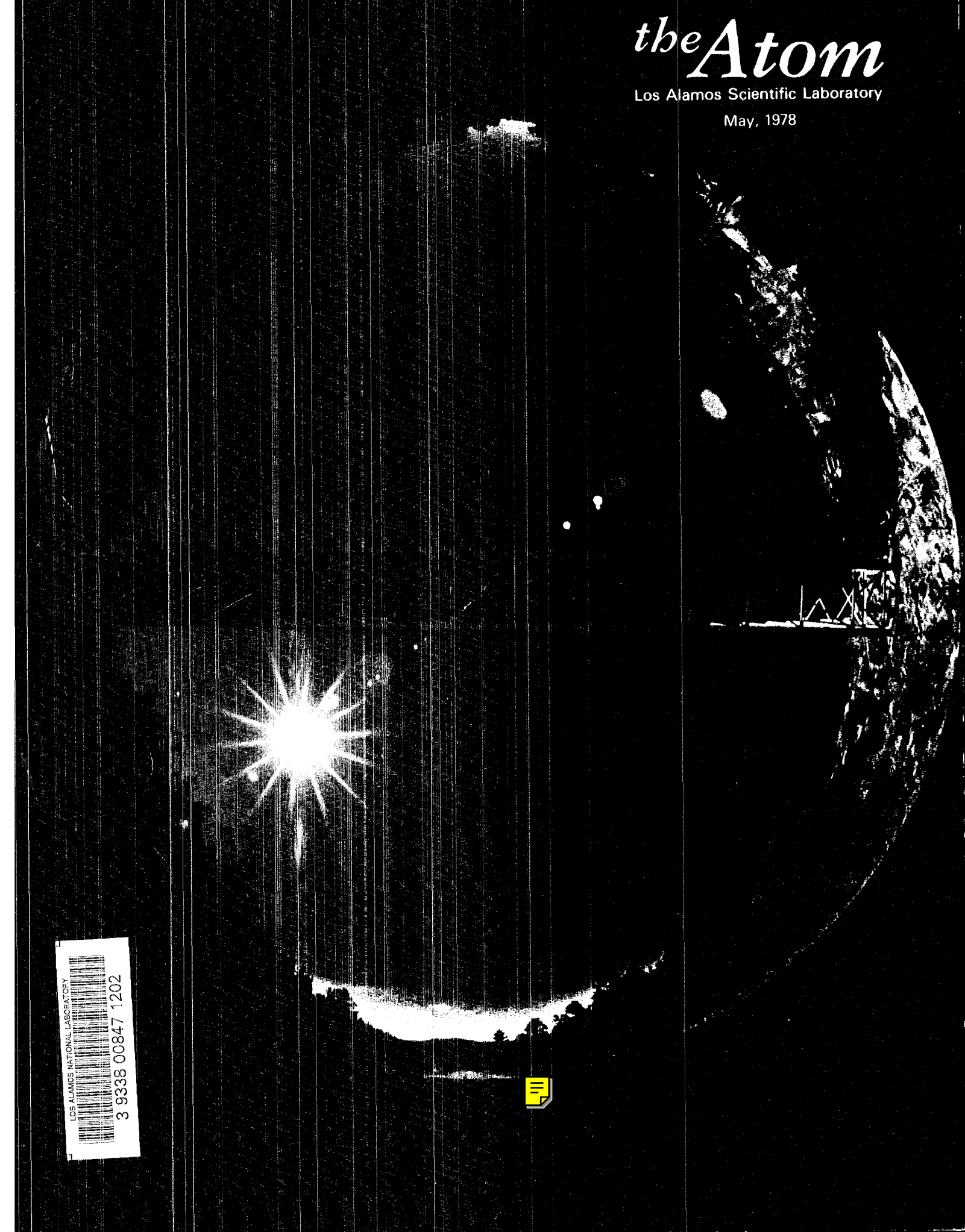
the Atom

Los Alamos Scientific Laboratory

May, 1978



*the*Atom

VOL. 15, NUMBER 4 MAY 1978

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REGULAR FEATURES

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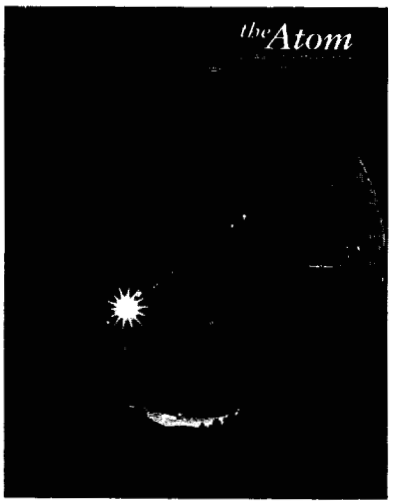
Published monthly except for July-August and January-February issues by the University of California, Los Alamos Scientific Laboratory, Office of Public Information. Address mail to MS 318, P.O. Box 1663, Los Alamos, New Mexico 87545. Second Class Postage Paid at Los Alamos, N.M. Printed by Panorama Press, Albuquerque, N.M.

Office

1325 Trinity Drive. Telephone (505) 667-6101. Address inter-office mail to PUB-1, MS 318.



Bill Jack Rodgers employed a "fish eye" lens to get this rather unusual view of the bridge and the canyon. Notice the automobile at the bottom of the circle. The lens enabled Rodgers to get all of the bridge, a view of the ground on one side and a view nearly to the ground on the other side.

Thermal Infrared Scanning

Information Gained Valuable In Fight For Conservation

by Jeff Pederson

The sound of an airplane sweeping low over Los Alamos in a series of passes 1000 feet above the ground can be disconcerting if you're trying to sleep during the wee hours. But the information gained about energy loss during those flights is a valuable weapon in the fight for conservation, as thermal infrared scanning has shown.

For two years now, the Laboratory has joined hands with the armed forces to establish photographic evidence of the conditions of more than 4 million square feet of roof at sites spread over a 100 square mile area. Roof insulation, and the costly leakage in 36 miles of underground condensate lines, have also been checked.

In March, 1977, two U.S. Air Force RF4-C reconnaissance jets each made 20 low-level passes at 400 miles per hour. In April and May of 1977, a U.S. Army OV-1D Mohawk turboprop carried out three similar missions at slower speeds more suited to the Los Alamos Terrain.

The result, combined with a rigorous ground-level program, is a series of photographs that show — when properly interpreted -- the escape of heat from buildings, moisture trapped within roof structures, and leaks in underground lines. "We accumulated enough information on needed repairs to last several years, considering man power and funding constraints," says Chris Haecker of LASL's Engineering Department, Maintenance and Operations Group (ENG-4). He also stated that the infrared scans, in print form, generally show warm areas as light and cooler areas as dark, and can pinpoint problems before they escalate into major repair jobs.

The Laboratory was able to locate and repair 13 underground pipe leaks in lines that bring spent steam from office and technical buildings back to the three steam generating plants. While the steam going to the buildings is "dry," the condensate returning to the steam plant is hot and wet, a relatively corrosive state. The pipe repairs conserve resources in 3 ways: they reduce make-up water, reduce fuel consumption at the boiler since the returned condensate is already close to 200°F, and save in water treatment chemical. The stakes are significant since overall condensate loss at LASL equals an estimated 10 million gallons per year.

Los Alamos is not an island in the demonstration of thermal infrared scanning. The detection of obvious heat loss is relatively widespread. Other cities, including Minneapolis/St. Paul and Philadelphia, have benefited from scans showing where energy is lost through win-

dows, chimneys, and roofs. The one aspect of the Los Alamos study that is unique is the detection of entrapped roof moisture, a warning sign of a deteriorating roof. This technology was adapted from the U.S. Army Corps of Engineers.

The infrared scannings work like this: thermal infrared sensors respond to energy radiated by substances with temperatures above absolute zero (0 degrees Kelvin). The higher the temperature, the greater the energy given off, and the wavelength of the energy radiated becomes shorter. The measured energy is quite small, and special detectors — such as semiconductors cooled to low temperatures by liquid nitrogen — are needed.

In the aircraft, a thermogram (or image of heat contrasts) starts with a scan of the terrain by a high-resolution camera. The ground below is "read" in a series of lines at right angles to the direction of flight. Infrared radiation is focused on a super-cooled detector that converts the signal to an electrical pulse. The pulse is amplified and then controls the electron beam of a cathode ray tube so the pilot can "see" the results during the run. The signals can also be relayed to a cassette tape for later analysis by a computer or go — via a glow lamp — onto black and white film.

Aerial infrared scanning for energy loss costs a small fraction of complete ground inspection. The scan photographs will pinpoint anomolies that should be verified by ground inspection, thus greatly reducing the manpower requirement. LASL employees traveled to the U.S. Army Corps of Engineers Waterways Experimental Station in Vickburg, Mississippi, to learn how to interpret the thermograms.

An aerial scan without subsequent ground investigation can be wasted effort since some "obvious" information is, in fact, misinformation. For example, trees show up as white, although they are not radiating heat energy as might a roof or an asphalt parking lot. Water surfaces, highly reflective, tend to show lighter since they reflect all of the "stray" infrared from the sky, which is present there even at night. Parking lots may show "shadows" of cars that have been moved hours before the pictures were taken.

An Army Mohawk turboprop airplane was used in the most recent thermal infrared flights over Los Alamos. Consulting a topographic map was Chris Haecker, LASL, and Army fliers S.Sgt. David Dorschner and Capt. Don Callicut. The plane came from Ft. Huachuca, Arizona, and used the Los Alamos airstrip during the scanning mission. Earlier flights were by Air Force jets.

"While LASL is certainly not the first place where infrared scanning has been used, it is unique in the depth of supporting information acquired," says Haecker. LASL personnel, working with the Army Corps of Engineers, established a weather and roof monitoring station on the Science Hall (SM-200, TA-3) and collected data for six weeks before and during the flights. Thermistors were placed on the roof at various points of differing insulation, thickness and moisture content. Solar-powered sensors took readings each 30 minutes on rainfall, wind speed, wind direction, air temperature, and

Chris Haecker from ENG-4 at LASL and Mike Floyd from the Army Corps of Engineers are shown on a rooftop with a data recording package. Laboratory personnel went to Vicksburg, Mississippi, to learn how to interpret aerial scans and ground information.

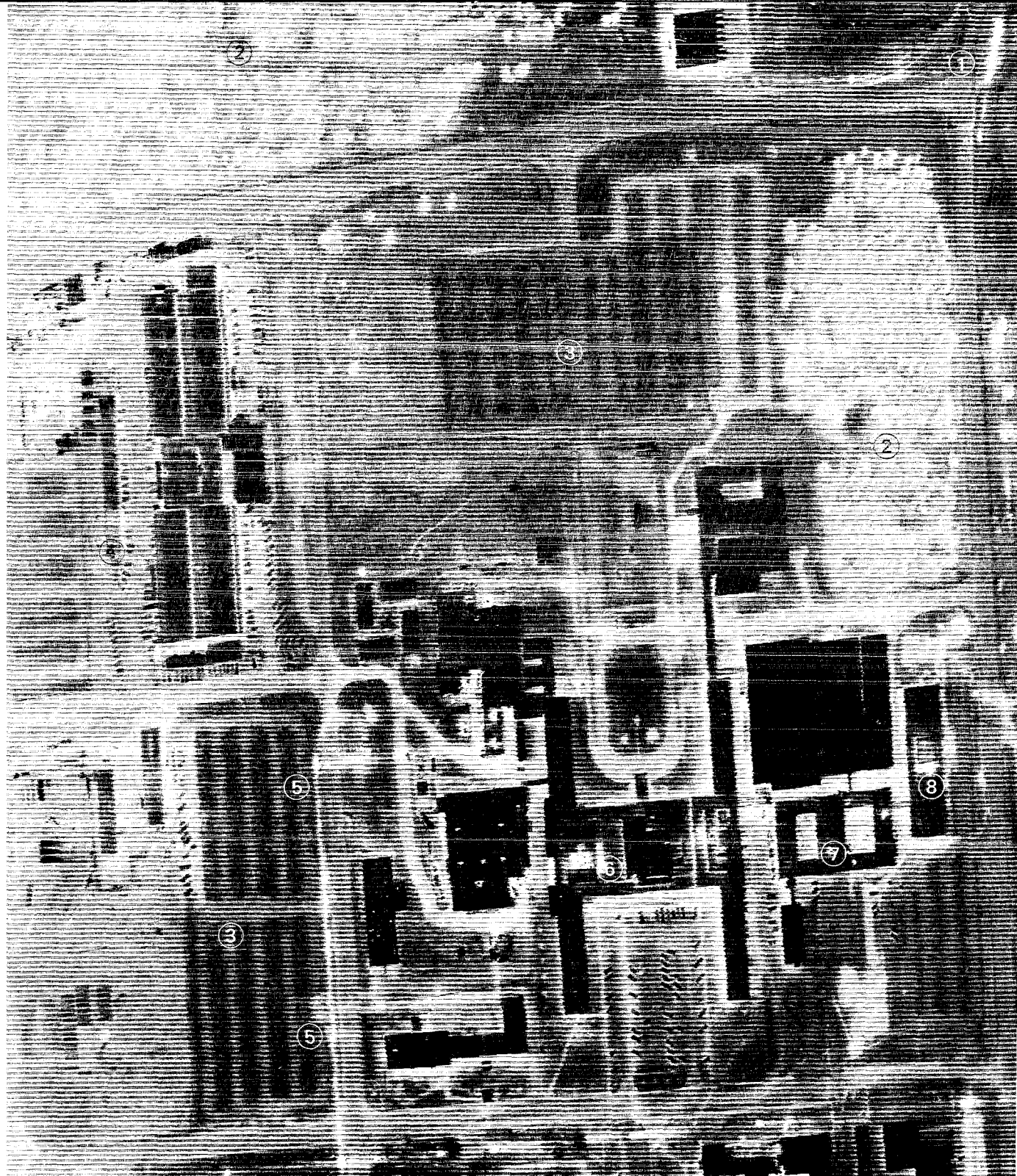
solar radiation. The data helped refine the mission criteria: season, climatic conditions, time of day, snow cover, etc.

It also aided in understanding the phenomenon of "crossover" in surface temperature of wet and dry roof areas. During the day, roof temperatures increased markedly due to solar radiation. The daytime maximums and nighttime minimums for wet and dry insulated areas are the same, but the areas with wet insulation "lag" by a couple of hours. This is attributable to the much greater mass of the wet insulation: it simply takes longer to heat up and longer to cool down because it will hold more heat. Thus, during a period of about 4 hours, beginning a few hours after sundown, the areas of wet insulation will be warmer than dry insulation by about 3°F.

LASL found that the thermal gain of the wet insulation offsets the deficiency of being a poor insulator, and is not an overall energy loser. This would not be the case in a climate with less sunshine. A wet roof, Haecker hastens to point out, is a precursor of roof deterioration, and cannot be tolerated in a program of preventive maintenance.

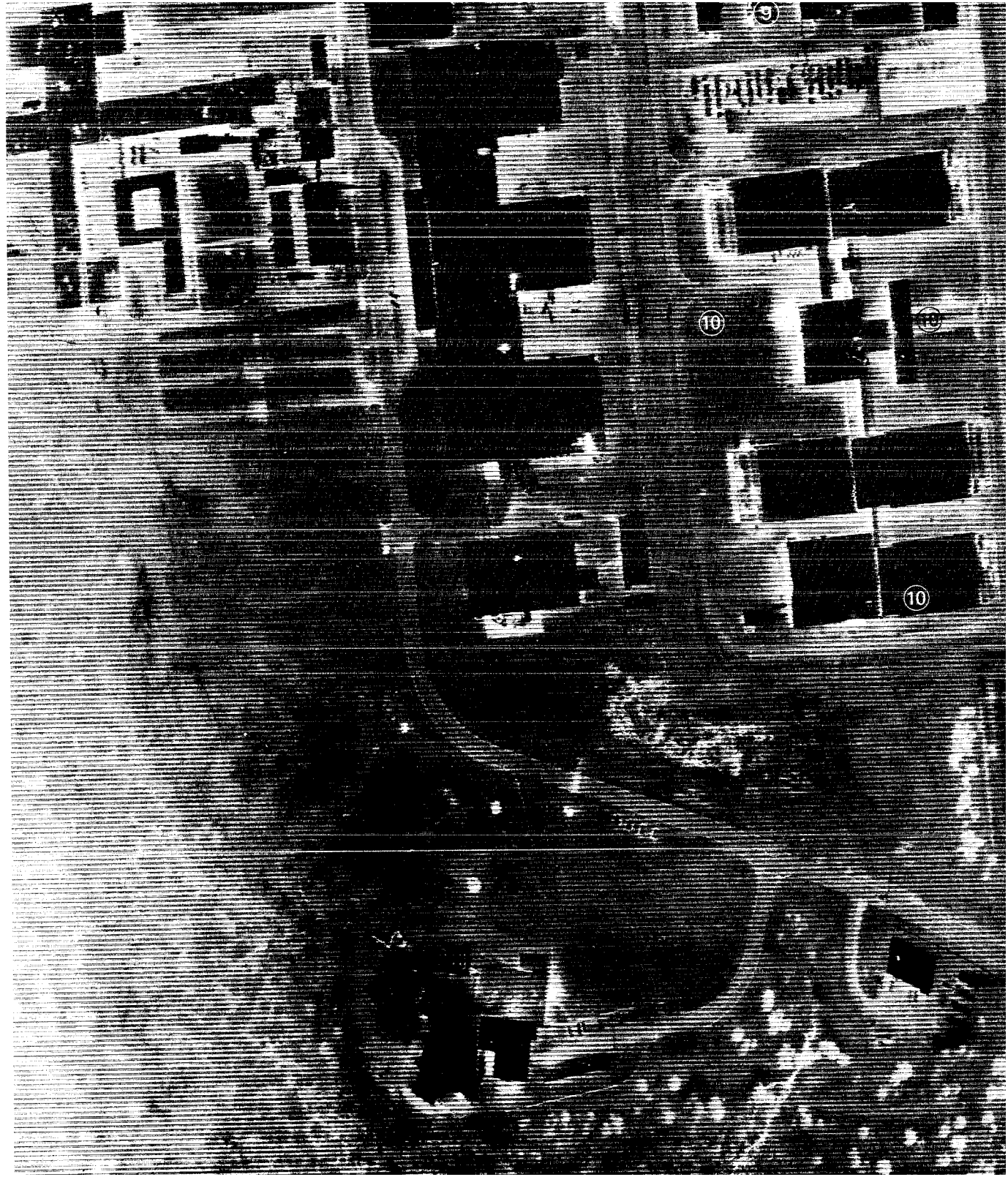
The same phenomenon can lead to deception where the roof insulation is entirely dry, but varies significantly in thickness or density. "If the photograph interpreter were unaware of the crossover phenomenon, you can see how easily incorrect conclusions could be drawn," says Haecker.

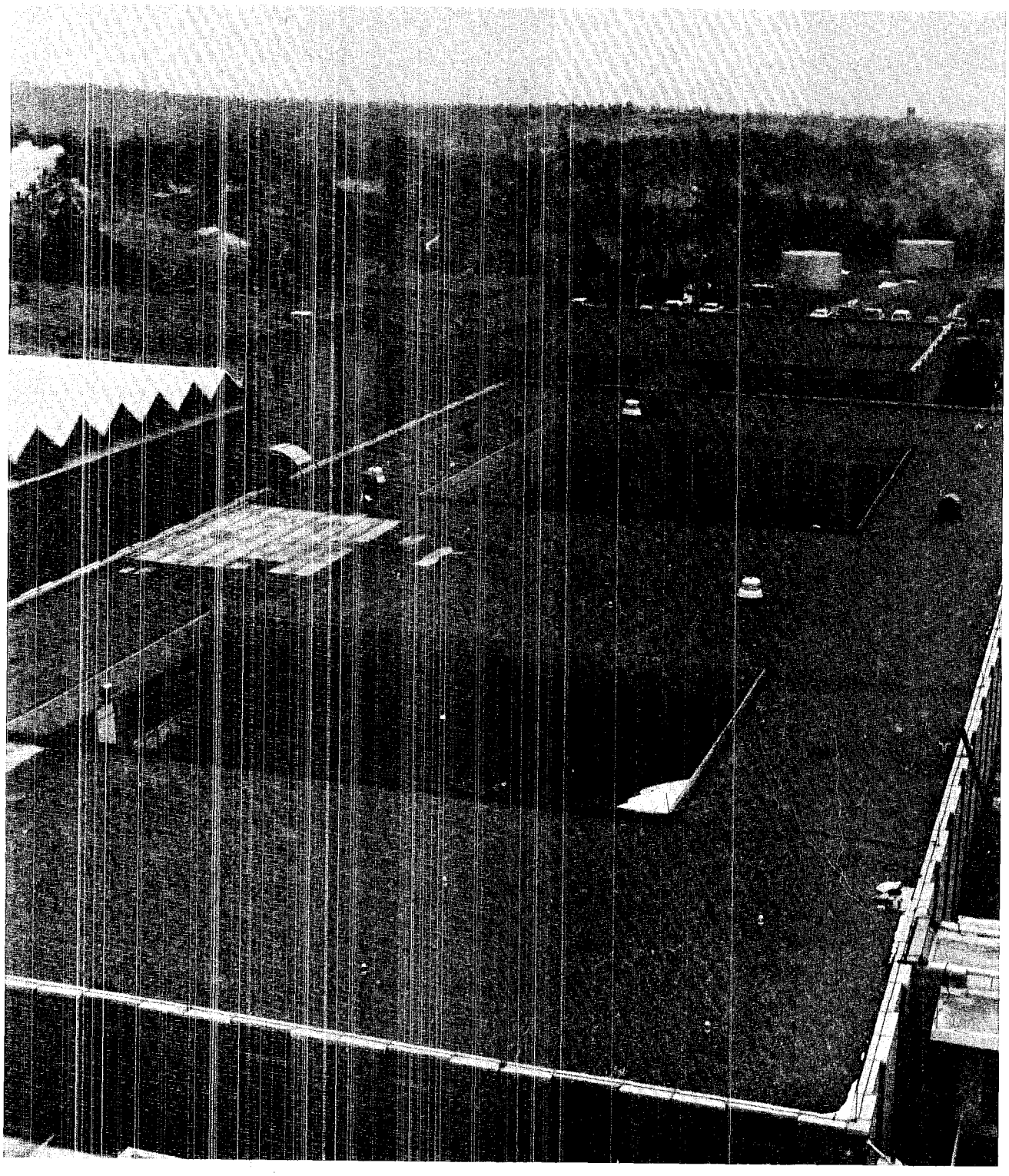
As a result of the ground station



data and photoimagery, it was concluded that the optimum flight time for simple heat loss, such as the condensate line leaks, is between midnight and sunrise, when the solar effect is minimized. For entrapped roof moisture, the maximum temperature differential occurred between 10 p.m. and midnight. If both types of information are desired, a midnight flight is the best compromise. As a further refinement, the time of sunset should be taken into account.

The main administrative area at LASL (TA-3) reveals some of its energy secrets to the camera's eye. At upper right, at the intersection of West Jemez Road and Diamond Drive (1), a leak along an underground heat pipe was detected and fixed. Groves of trees (2) show as light-colored. "Shadows" from previously-parked cars show up clearly (3) in parking lots. A portion of a warehouse now converted to office use is apparently under-insulated, judged by its light roof (4). An underground condensate line can be easily traced by the thermogram (5). The main Administration Building (6) has a fairly tight roof but shows white spots where heat is lost through venting pipes and shafts. The Science Hall (7) and the Personnel Building (8) both show signs of entrapped roof moisture, which could lead to future deterioration. A power substation (9) produces heat which shows up on film. Other buildings at the TA-3 site show white around the edges, normally a sign of heat being lost through windows and doors (10).





A ground data system, with wires trailing off toward the right, was installed in the roof of LASL's Science Hall. Thermistors gathered information about insulation and moisture over a 6-week period, and ground knowledge was used to verify aerial thermograms that showed areas of heat loss.

The thermal scans are not limited to government applications, and some 30 private firms and agencies now have the aircraft and scanners to perform an aerial check. "Of course, some people's first impression is to fly over a big city and pinpoint energy losses," says Haecker. "But there are some worries with this since it involves overhead detection. Is it private information, and do people have the right to privacy? How should the information be disseminated? For example, in one small community, the home repair con artists descended after such a scan. In addition, we feel the ground survey is necessary to validate results. How will you get information about thermostat settings and insulation thickness?" Haecker feels the best benefit from such scans is to large governmental or industrial sites.

There have been other applications, perhaps with less of the scientific verification used by the Laboratory. Last year, aerial pictures were made available to householders and businessmen from 25 cities — including Minneapolis, St. Paul, and Duluth — in Minnesota. Flights were made during cold nights when humidity was low, skies were clear, and no snow was accumulated on roofs. The project was undertaken by the Energy Research and Development Administration, the Minnesota Energy Agency, and the Environmental Protection Agency.

Heat from roofs, pipes, exposed industrial equipment and other objects was shown as white in the infrared pictures. Specific buildings and heat losses were identified using conventional aerial photos. Residents were trained to interpret the photos, and public seminars were held to explain the results.

Experimental thermography tests have also been conducted in Philadelphia, with the idea of showing many areas in a large city with one flight. Ground-level thermograms were used to verify aerial results. The greatest energy losses came from poor insulation, improper caulking, and lack of weather stripping. Older masonry buildings with small windows lost less heat than modern, full-window skyscrapers, according to researchers from NASA, the Naval Air Development Center, the Federal Energy Administration and the Mayor's Science and Technology Advisory Council.

The Philadelphia tests also showed that heat loss, measured by time, was 35 times less for tightly-packed 6-inch insulation, compared with 2-inch loosely-packed batts. After a period of time, fibers of thicker material tend to bind themselves together and seal minute holes. Changes in the density or uniformity of insulation, researchers also found, can cause excessive heat losses due to convection.

Thermograms have been used with other subjects, including smokestacks, expansion bellows in pipe lines, and to pinpoint fire hazards at oil refineries.

It's now been a year since LASL contacted Lewis E. Link, Chief of the Environmental Research Branch of the Mobility and Environmental Systems Laboratory operated by the Army Corps of Engineers in Vicksburg, and a lot has been learned in the meantime. "I feel we can justify such a flight on a yearly basis," says Haecker. "The 13 underground leaks that were repaired in one year alone justified the expenditure." A single mission will cost less than $3,000, due to the first year's research and perfection of the techniques for LASL's environment.

"The aerial scans are efficient in determining gross temperature differences," Haecker notes. "What makes it work is having accurate knowledge of what is going on with the ground situation and the climate. If your information is inaccurate, your results can look funny. We've certainly gotten what we needed out of the thermal scans. We've proven our technique at a nominal cost. We anticipate widespread use of thermal infrared technology in the future."

From LASL to Strategic Air Command bases to buildings in major cities, the thermal scanning field is growing. However, as Anthony P. Pontello, a Department of Energy engineer in Philadelphia puts it, "Regardless of the success thermography has enjoyed acting as a watchdog over energy waste, it should be remembered that the individual who is taught energy conservation measures developed yesterday, and stops practicing these same measures today, becomes a victim of his mistakes tomorrow."

"We've gotten what we needed out of the thermal scans."

Short Subjects

Robert H. Martin, ISD-7, was presented with the National Award by the Professional Photographers Association of New Mexico at the group's 27th annual convention in Santa Fe this spring. This is the second time Martin has received the national award, given to an individual who has contributed outstanding service to professional photography. Also recognized at the spring convention were ISD-7 photographers **Henry Ortega**, who received a Distinguished Print Award, and **Fred Rick**, who received first place trophy. Rick also tied for best-of-show with photographer Jack Grimes of Albuquerque.

* * *

A Systems Analysis and Assessment (S) Division was formed at LASL effective April 1, 1978. **James M. Williams** became S-Division head effective May 1, with **Ronald K. Lohrding** as acting alternate S-Division leader. The division, formed initially from group Q-12 in Q-Division, is an interdisciplinary one, with expertise in statistics, economics, systems modeling, computer sciences, sociology, physics, and environmental planning.

* * *

Kaye D. Lathrop was appointed head of C-Division effective April 17, 1978. He had been serving as alternate leader of Q-Division since February, 1977.

* * *

Darleane C. Hoffman, associate group leader of CNC-11, has been granted a Guggenheim Fellowship award for 1978. She is among 292 scholars, scientists, and artists chosen from among 3,073 applicants in the 54th annual competition. The year-long grant begins this fall and will enable Hoffman to study the mechanisms of nuclear fission. Hoffman has worked at LASL since 1953 and is credited with the discovery of plutonium-244 in nature.

* * *

Steven J. Gitomer, L-6, and **Albert G. Engelhardt**, L-4, have been elected senior members of the Institute of Electrical and Electronics Engineers. The designation is the highest professional grade in the Institute, and is awarded to only 12 per cent of the organization's 180,000 membership.

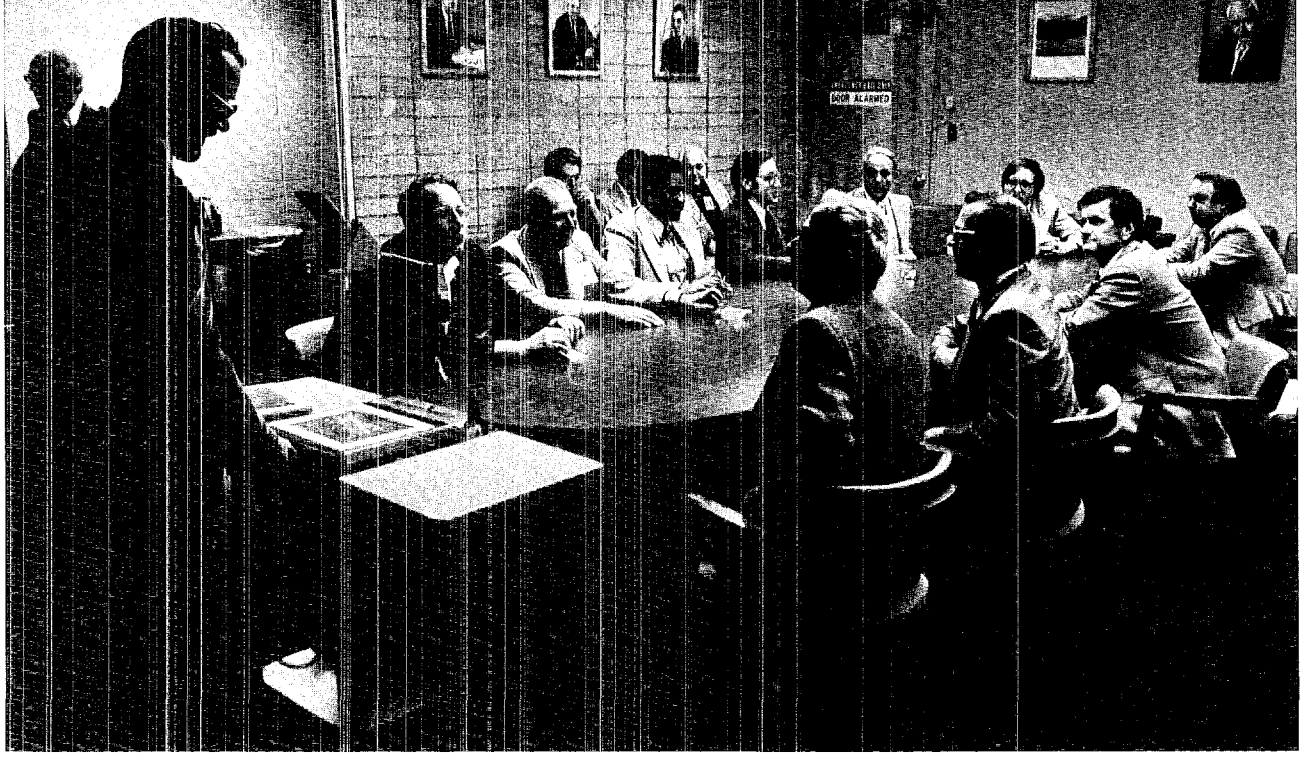
Robert L. Ratliff, an enzymologist in H-9, has been honored by the New Mexico Chapter of the American Institute of Chemists, and has received as part of the honor the New Mexico Institute of Chemists 1978 Honor Scroll Award. The award is given each year to an outstanding New Mexico chemist or chemical engineer. Ratliff's field of expertise is in the purification of nucleic acid polymerases and other enzymes involved in the synthesis of nucleic acids. He was the first scientist in the United States able to provide a purified enzyme, extracted from the thymus glands of calves, needed in recombinant DNA research.

PATENTS

John P. Rink, AP-2, was awarded U.S. Patent 4,063,190 on December 13, 1977, for inventions relating to a pulsed gas laser comprising an optical resonant cavity, a CO_2 lasing medium, structure for containing the CO_2 lasing medium within the optical cavity, and a device for causing a population inversion in the lasing medium, with a novel improvement in the structure for causing a laser pulse of certain wavelengths.

* * *

Cyrus D. Cantrell, T-12, **Robert J. Carbone**, on leave of absence from L-Division to attend medical school, and **Ralph S. Cooper**, formerly with AP-Division and now with Physics International in California, were awarded U.S. Patent 4,061,921 on December 6, 1977, for an invention relating to an infrared laser system. Objectives of the invention are to provide infrared laser systems for use in separation of isotopes and which are capable of producing very high power laser beams at selected wavelengths which are not inherent to a particular lasing medium. It also has as an objective the providing of high power laser beams at specific wavelengths which correspond with excitable vibrational states of uranium hexafluoride or other gaseous uranium compounds at reduced temperatures.



Kerr, Deutch Here For Program Review

John Deutch, Assistant Secretary for Energy Programs, DOE, and Don Kerr, Assistant Secretary for Defense Programs, DOE, and members of their staffs visited LASL during the second week of April for a review of the Laboratory's involvement in energy and weapon programs. In the photo above, Deutch, at the front of the table, left side, and Kerr, second from the front of the table on the right, listen to Robert Brownlee, G-Division head, discuss geothermal programs. Below, Joe Ladish, L-1, explains the 8-beam laser system operations to Kerr and Deutch, center of photo.

In 21st Year

Science Youth Days

About 700 students from 5 states traveled to Los Alamos this April for the 21st annual Science Youth Days.

The 3-day event, sponsored by LASL in cooperation with the Thomas A. Edison Foundation, is entering its third decade of providing information about scientific research to science-oriented students from New Mexico and surrounding states.

The students heard lectures, saw movies, and toured the Laboratory for first hand looks at research procedures. Participation in the science event is by invitation, with students coming from Colorado Springs, Amarillo, Los Angeles, Phoenix, and many other cities.

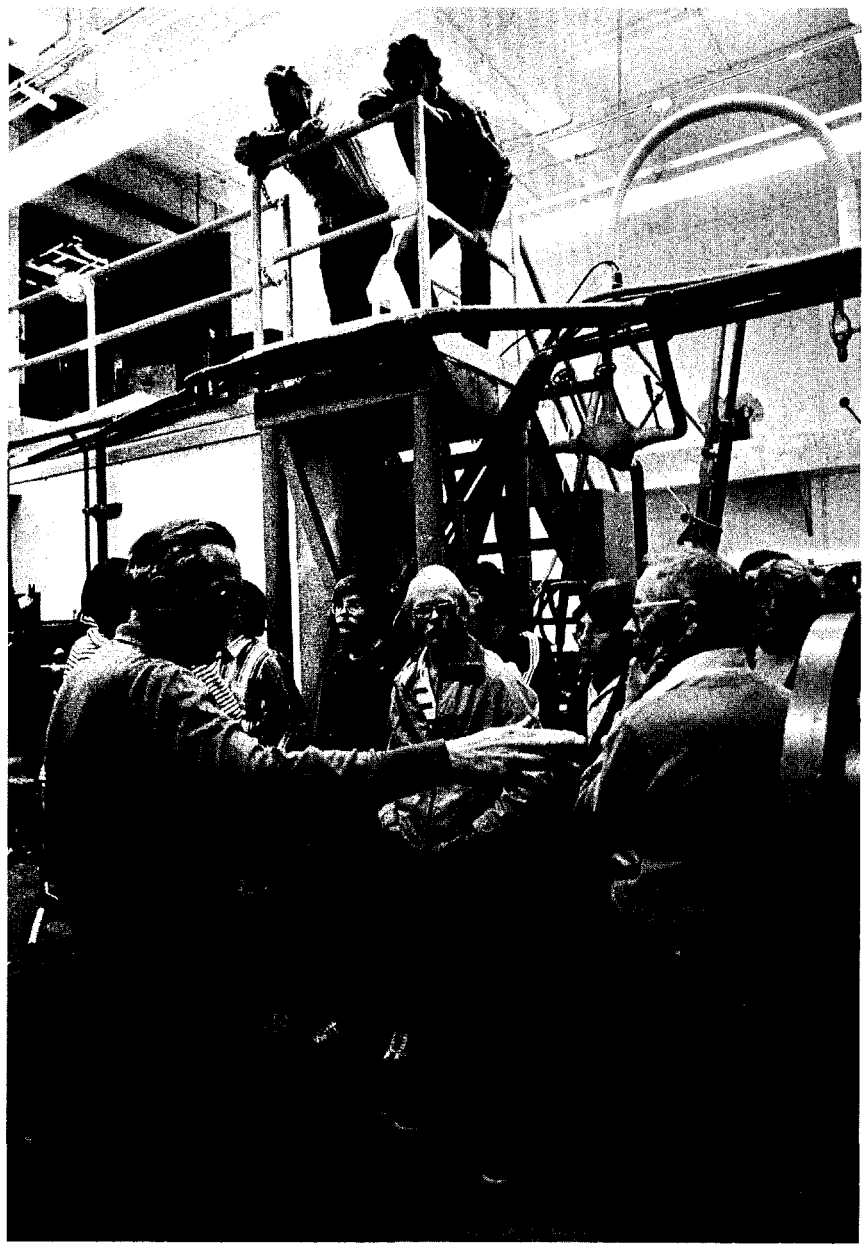
The first day of the Science Youth Days, April 12, was reserved for Los Alamos High School students. The second day was reserved primarily for New Mexico school students, and out-of-state visitors visited the Laboratory on April 14.

Students were welcomed each morning by Charles Browne, associate director for administration at LASL.

Presentations on geothermal energy, laser fusion, LAMPF, nuclear waste treatment, cyrogenics, solar research, environmental and health studies, particle studies, and many other subjects were part of the activities for the students.

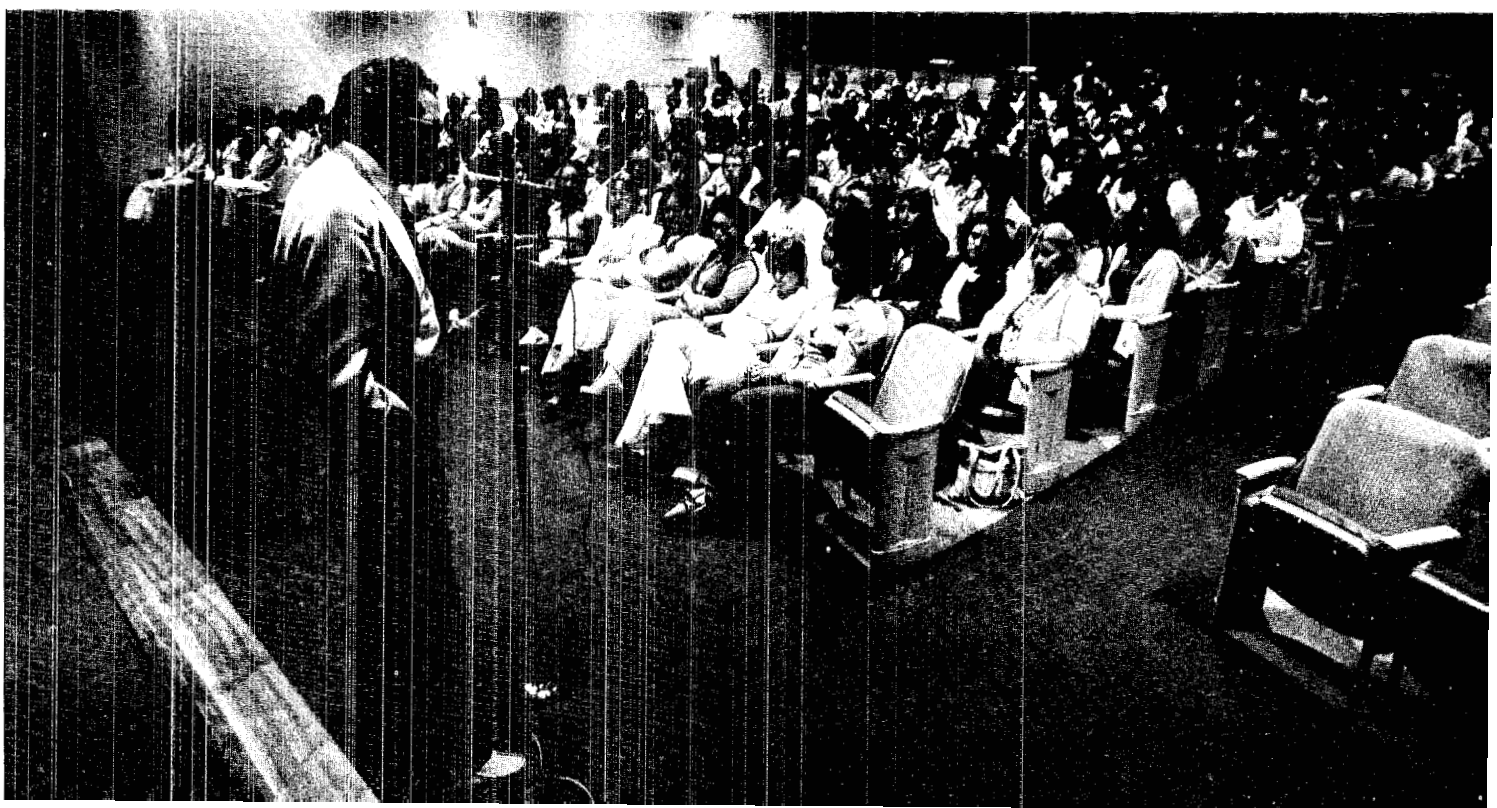
Los Alamos High School students served as honor guides for the Science Youth Days.

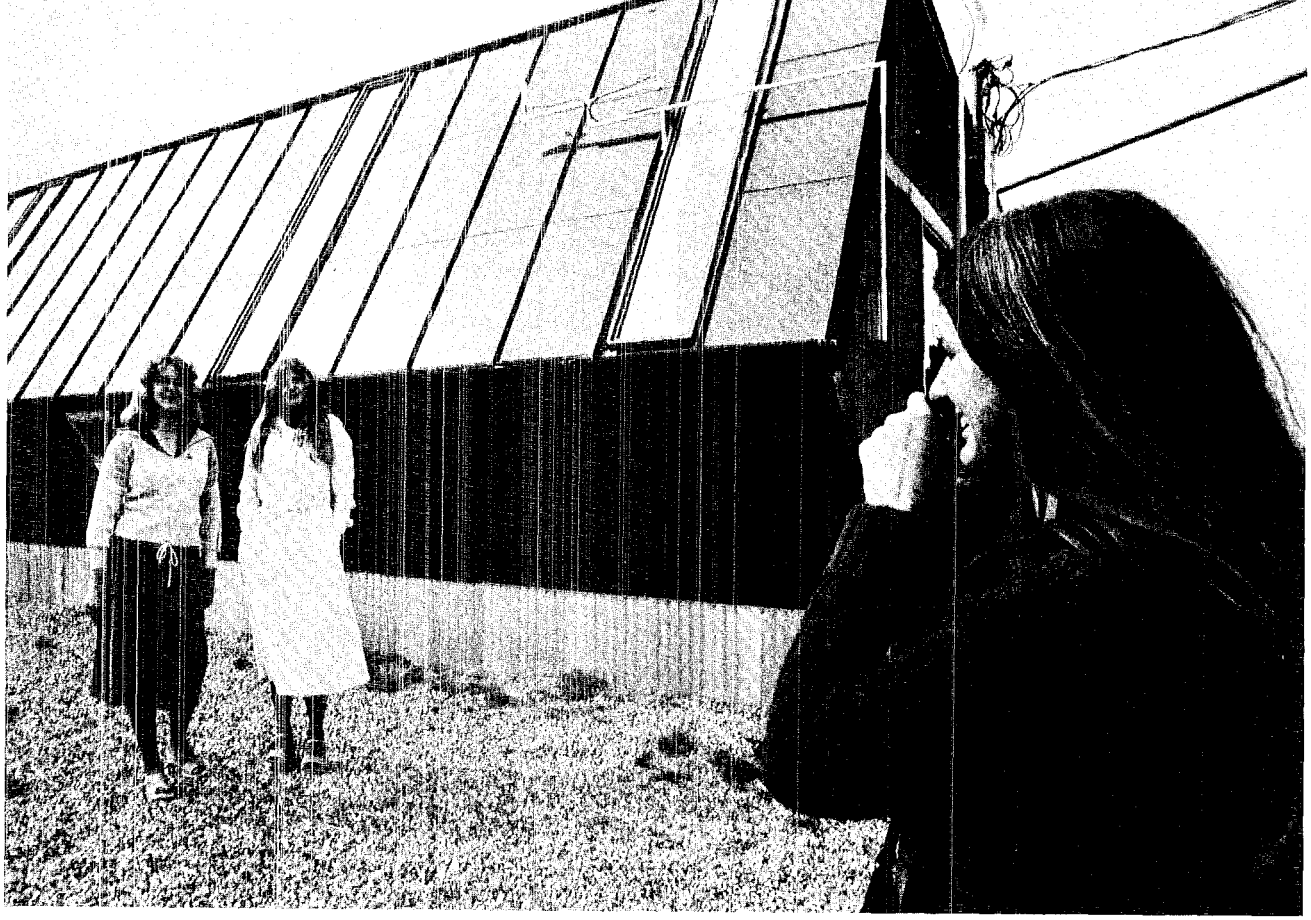
The event is noted internationally in connection with Edison's birthday anniversary, February 11, but some participants, such as LASL, schedule visitors later in the spring due to uncertain weather.



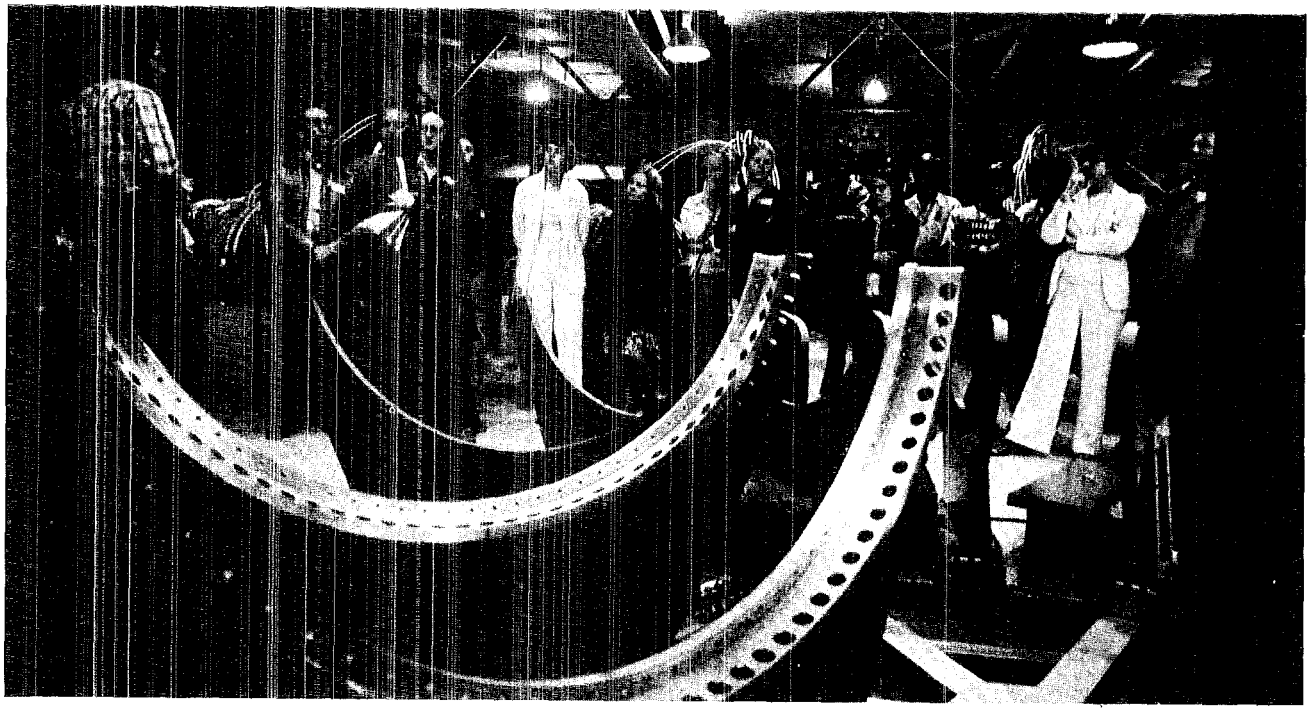
John Dean, Q-10, explains operation of the cyrogenics experiments at LASL.

In the photo above, Nelson Jarmie, P-9, describes the Van de Graaff accelerator, and Charles Browne, associate director for administration at LASL, below, welcomes a group of visiting science students to Science Youth Days.





Saguaro (Scottsdale, Ariz.) High School student Shari Tims, right, photographed classmates Melissa Hallstrom and Lindy Jensen at one of LASL's solar modular homes, and below, Piet Van der Laan, CTR-DO, explains the theory of magnetic fusion of plasma gases to science students and faculty members.



Agnes Roybal, LASL museum guide, demonstrates remote-handling equipment, similar to equipment used in areas where radioactive materials must be handled, to science students attending the annual Science Youth Days. In the photo below, Bill Keller, Q-10 group leader, lectures on cyrogenics.

For Overview of Programs

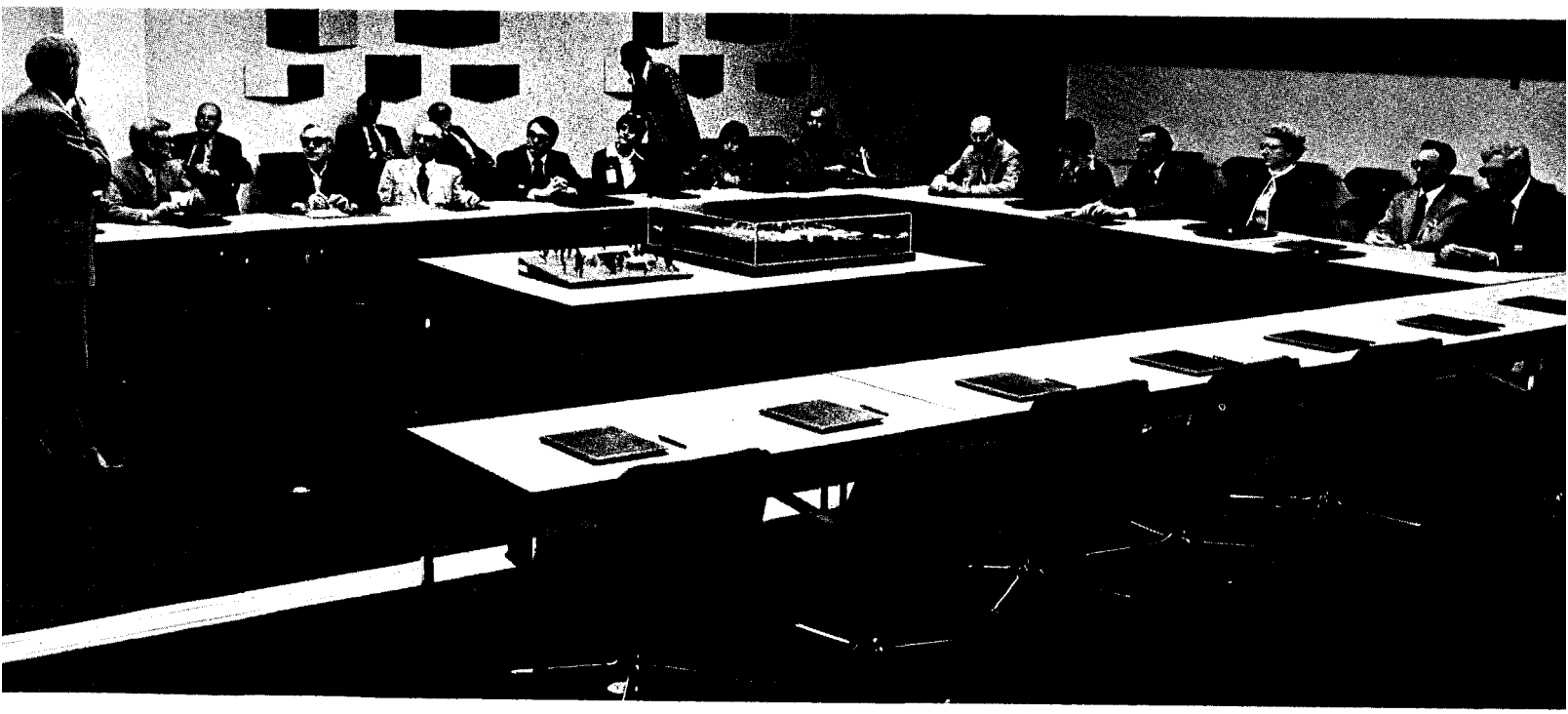
UC Regents Visit LASL

Regents and officers of the University of California visited LASL March 30-31 for an update on research programs.

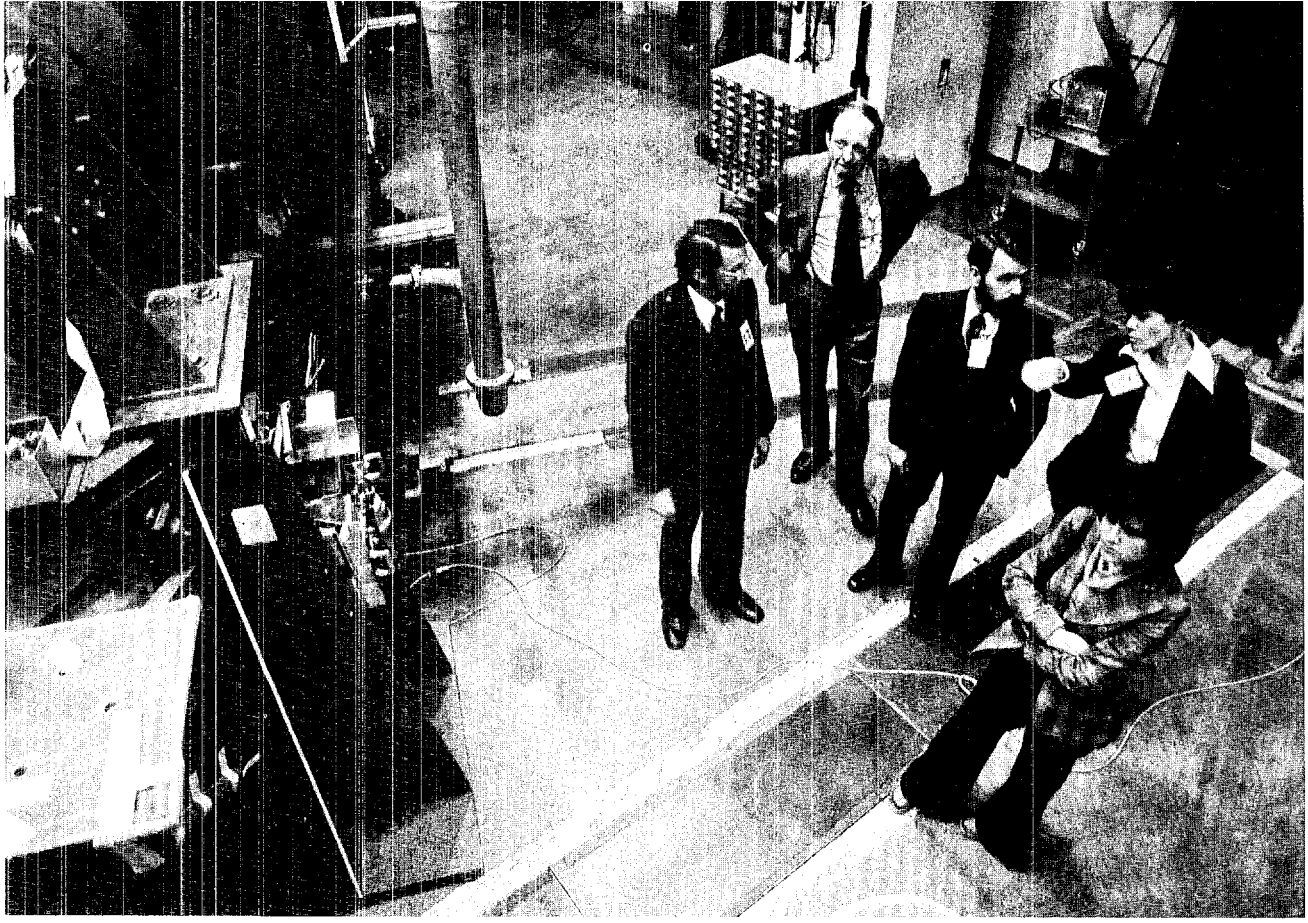
Harold Agnew, LASL Director, gave the UC officials an overview of programs, and other Laboratory personnel briefed the visitors on programs such as reactor studies, geothermal energy, laser fusion, nuclear safeguards, and stored magnetic energy systems.

The Regents and officers also had a tour of the solar-heated and solar-cooled National Security and Resources Study Center, the Bradbury Science Hall, and laser research facilities during their first day.

On the second day, the group toured LAMPF for an overview of the accelerator and an explanation of the treatment of cancer patients with pion particles. They also visited the plutonium handling facility and were briefed on Health Division activities, and the Oklo phenomenon, a natural atomic reactor in Africa.

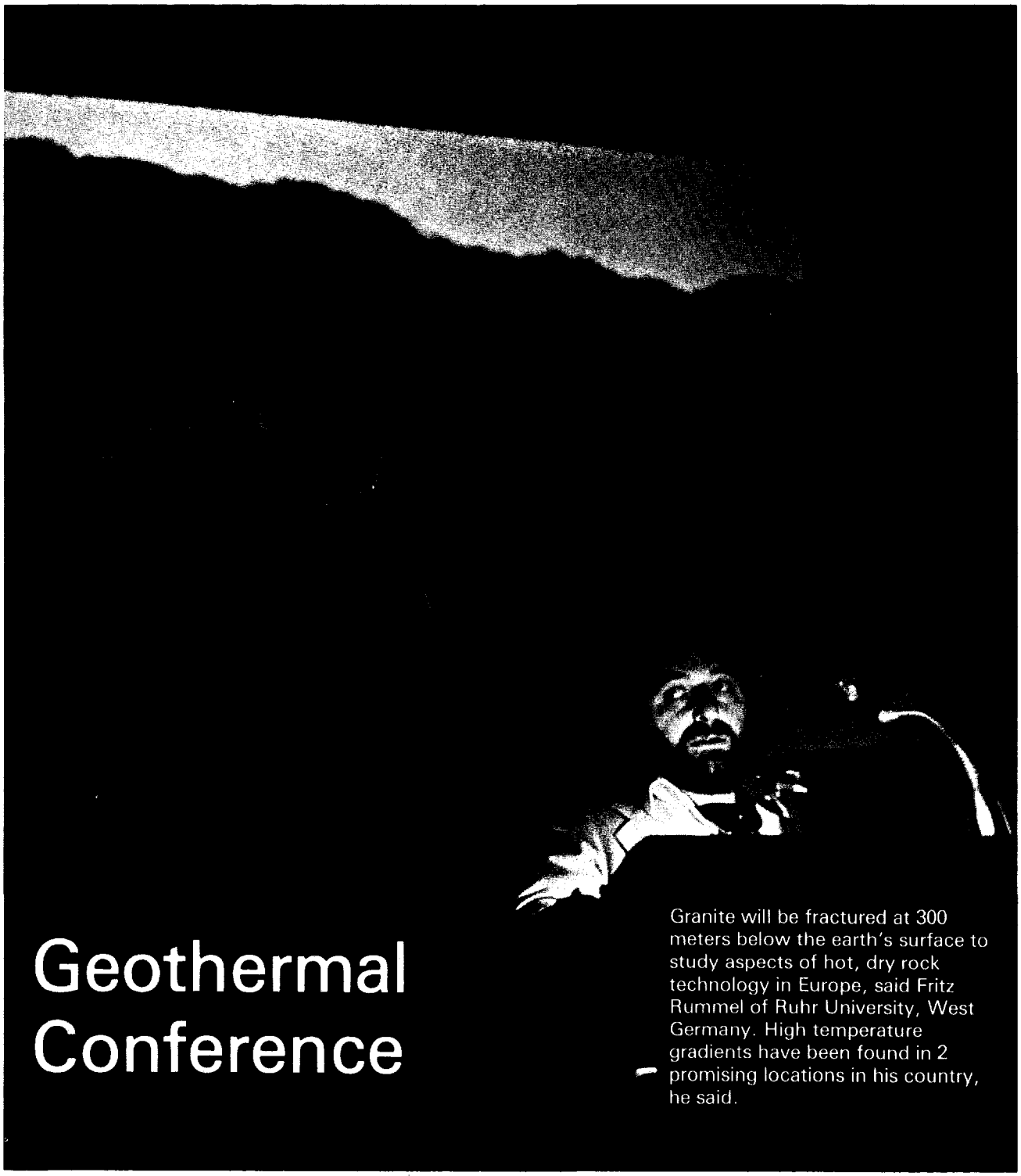


LASL Director Harold Agnew welcomes University of California Regents and officers to the Laboratory in March for an update on programs. The visitors had 2 full days of briefing and tours, including the National Security and Resources Study Center, where this picture was taken.



L-Division head Roger Perkins, and Joe Ladish, L-1, explain theories and operations of the 8-beam CO_2 laser system to University of California visitors.

The UC visitors are briefed on classified programs.



Geothermal Conference

Granite will be fractured at 300 meters below the earth's surface to study aspects of hot, dry rock technology in Europe, said Fritz Rummel of Ruhr University, West Germany. High temperature gradients have been found in 2 promising locations in his country, he said.

The picture for commercial use of hot, dry geothermal energy is brightening, as shown at an April 19-20 conference, sponsored by LASL's Geosciences Division and held in Santa Fe. The Laboratory's experiments and technical successes with the underground fracture system at Fenton Hill provided the focus for the 2-day event, which was attended by more than 200 representatives from government, universities, energy companies, and drilling-related firms.

Conferees explored the horizons of this new heat source, which was proven technically feasible last summer. They came from 18 states and 9 countries; 23 speakers presented a variety of topics at the Sweeney Center podium. The Laboratory project involved drilling 2 holes and making a fracture in granite nearly 10,000 feet down; cold water is pumped through the fracture system and comes to the surface at temperatures significantly above the boiling point.

The technology behind hot, dry rock exploration has advanced dramatically, said Frank C. DiLuzio, LASL assistant director for government and university relations. Government research and development programs can search out geothermal resources, work on fracture techniques, and provide leadership in special instrumentation at high temperatures. But government cannot at the same time supply energy directly to consumers, the keynote speaker said. "Private industry must provide the plants" beyond the experimental power plant phase, said DiLuzio. "Industry must come in early," he stated, but the risk lies in not having all the answers to satisfy industry.

There is relatively little power being produced presently from the geothermal sites, said Carel Otte of Union Oil Company, but the expansion of this new energy source is imminent. A surge is being felt in leasing, exploration, and drilling in Utah, Nevada, and southern California, said Otte, who was the featured speaker at the banquet.

Although LASL's experiments have expanded the field of interest in hot, dry rock, more government stimulation in the form of funding or tax breaks will be needed, said the speaker, whose company has joined with Public Service Co. of New Mexico to propose a 50 megawatt generating station — with government funding assistance — on part of the Baca land grant in the Valle Grande area of the Jemez range. The proposal, now under study by the Department of Energy (DOE), differs from the LASL concept in that it would tap existing supplies of naturally-heated water (a hydrothermal process) and bring it to the surface to power a turbine. Otte said 2 major factors in geothermal energy extraction would involve: lowering drilling costs (which are about twice that of oil and gas drilling), and the stimulation of production from hydrothermal wells.

"The goals are demanding but we believe they are achievable," said Louis B. Werner, deputy director of the Division of Geothermal Energy, DOE. About 10 per cent of America's electrical needs could be

Presiding at the first session of the geothermal conference in Santa Fe was Al Blair of LASL's Geosciences Division. About 200 persons came from 18 states and 9 countries to hear more about the hot, dry rock project in the Jemez Mountains.

supplied from geothermal energy within the next generation, he said. Tests are being conducted in the Imperial Valley of California, in Hawaii, along the Gulf Coast, and in New Mexico, where the LASL project is an "exciting prospect," he added.

Cliff Carwile, also from DOE's Division of Geothermal Energy, said that while a proposal to fund the hot, dry rock program at $12 million for the next fiscal year has been cut to $9 million by House committee action, the final outcome has not been settled. The current budget is $5.4 million, he said, with a large portion of that going to LASL.

Many LASL personnel spoke about hot, dry rock program components, including funding, drilling, instrumentation, heat extraction, and economics. Among the industry speakers was D.J. Howell of Republic Geothermal, Inc., who rhetorically asked, "If it's so good, why aren't we doing it now?" Financial backers aren't stepping forward, he said, because they fear to take a new risk. Utility companies aren't ready to commit themselves, he added, although the drilling and support firms are already in existence.

Howell said technical risks were diminishing, thanks to LASL experiments, but said federal incentives — in the form of income tax reductions, depletion allowances, or tax deferrals — would have to play a part in developing this new technology. "It works," said Howell, "but we're going to need some help . . . the booster is going to have to be Uncle Sam."

Fritz Rummel of Ruhr University presented a European view of hot, dry rock. He chairs a committee in West Germany that is charged with investigating such exploration and said, "We in Europe feel we were stimulated to look into the possibility of geothermal extraction" after LASL's successes. Studies are underway in Germany, Sweden, England, and France, he said. High temperature gradients have been found in the Landau and Urach areas of his homeland. Fractures will be made at shallow depths to study the flow of water through a fracture system at about 300 meters below the surface in West Germany.

A.L. Martinez of Public Service Co. of New Mexico said his firm has looked at hydrothermal energy resources since 1969 and said hot, dry rock would basically "supplement" existing generating capacities. A 5-volume proposal, co-written with Union Oil Company, was submitted to DOE January 31, said Martinez, and involves a hot water system in the Jemez mountains. The underground reservoir could probably generate 400 megawatts for 30 years, and its full potential could reach 3 or 4 times that amount of power. Utilities would have more confidence with geothermal energy systems as experience made such ventures less risky, he said.

Tours to the Fenton Hill hot, dry rock site wound up the conference. LASL recently completed a 75-day "shakedown" test of the closed-loop system. Results showed that dissolved solids were limited to 1,000 to 2,000 parts per million in the circulated water. Impedence of water flow through the reservoir was found to have decreased significantly. In addition, downhole water losses diminished to only a few gallons per minute.

The success at Fenton Hill has also resulted in LASL being called upon to manage a national program to assess hot, dry rock resources and to select sites for future experiments. There is enough potential energy within relatively easy drilling distances to supply much of America's energy needs for many generations to come.

At Fenton Hill, drilling into granite formations proceeded at about 8½ feet per hour, said LASL's Bob Duffield. The drilling and service industry is already established in America, he said, where some 500,000 holes have been drilled over the years for oil and gas exploration.

LASL Hosts Accelerator Conference

Los Alamos Scientific Laboratory was host March 30-31 to a meeting of directors of high intensity particle accelerators from 5 countries. The scientists discussed international cooperation in research from physical and budgetary points of view.

Meeting participants included J.P. Blaser from the Swiss Institute for Nuclear Research; P. Demos and William Turchinetz from the Bates Accelerator at Massachusetts Institute of Technology; J.T. Sample from the TRIUMF accelerator in Canada; C. Schuhl from the Electron Linear Accelerator in Saclay, France; A.M. Wapstra from the IKO facility in Holland; E. Buerty from the Saturne facility in Saclay, France; Gunnar Tibell from the CERN facility in Switzerland; and Andrew Bacher of the University of Indiana.

Accelerators that produce mesons have become important components in nuclear science and technological programs, according to Louis Rosen, director of the Los Alamos Meson Physics Facility (LAMPF). A worldwide coordination of capabilities could be beneficial because mounting pressures to provide experimental time are challenged by limited budgets, he added.

The international meeting, which is to be continued on a yearly basis, has 4 main goals: Better mechanisms for communications regarding experimental results, programs under way, and plans for the future, are to be estimated; the programs may be meshed to avoid unnecessary duplication of effort by taking account of the different energy ranges and duty cycles of the various accelerators; conferees will explore the extent to which large scale theoretical calculations — involving large amounts of computer time — can be coordinated; and, finally, overall improvements for instrumentation and machine capabilities will be considered.

Louis Rosen, director of LAMPF, discusses high intensity particle accelerator programs with accelerator scientists from the United States, Canada, France, Switzerland, and Holland.

10 Years Ago

Compiled from the May, 1968 *Atom* and the *Los Alamos Monitor* by Robert Y. Porton

OFFERING

The Department of Housing and Urban Development (DHUD) offered the AEC-owned apartments in Los Alamos for sale today. More than 1,000 units are being offered for sale in 130 lots. At the same time, the commission sent out priority application forms to its tenants in an effort to determine who the priority holders might be. Nearly all of the quads are being put up for sale in units valued from $19,550 to $26,300. Each group will be subject to a 25 per cent discount. The Gold Street apartments are in lots of 16 to 20 units, with the appraisals ranging from $55,350 to $70,000.

COMMENCEMENT

Speaker at the commencement for Los Alamos High School graduates will be Earl C. Bolton, Vice President of the University of California. Bolton joined U of C in 1960 as a Special Assistant to President Clark Kerr. He was named Vice President of University Relations in 1961, Vice President for Administration in 1964 and Vice President for Governmental Relations in 1966. He is in charge of Federal Relations, Contract and Grant Administration and supervises the University's Atomic Energy Program.

APPOINTMENT

E.F. Hammel, CMF-9 group leader, has been appointed to a one-year term as chairman of the advisory panel to the Heat Division of the National Bureau of Standards. The Heat Division panel is one of a number of technical advisory groups whose members are appointed by the National Academy of Science - National Research Council to provide technical advice to the Bureau.

DISCOVERY

Two new isotopes have been discovered by Los Alamos Scientific Laboratory J-11 radiochemists. The isotopes were discovered through experiments using plutonium-244, the most stable of the plutonium isotopes and therefore ideal for use as a target material in the production of new isotopes. They were chemically separated from the products resulting from alpha particle bombardment of the plutonium 244. The new isotopes have been labeled AM^{247} and AM^{246} and are short-lived. The AM^{247} has a half life of 24 minutes, while AM^{246} has a half life of 40 minutes. Group J-11 received 1.5 milligrams of plutonium 244 last April, and experimentation began shortly thereafter. The 1.5 milligrams of Pu^{244} represented one-fifth of the world's known supply at that time.

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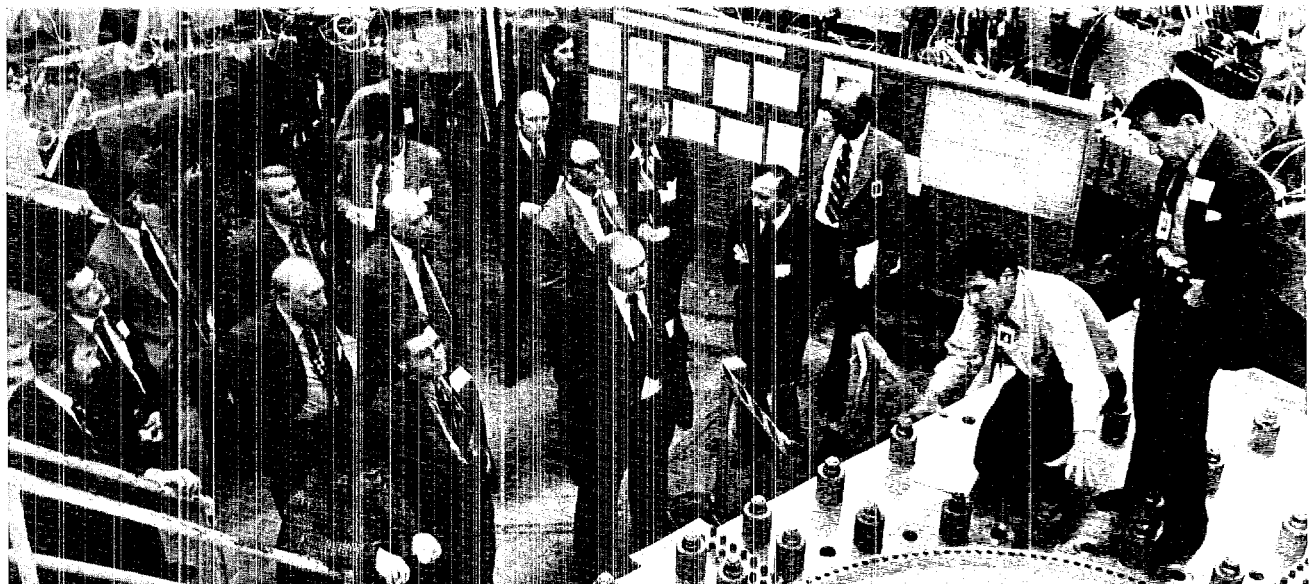
Estelle R. Ramey, a professor in the department of physiology and biophysics at Georgetown University, spoke on "Women in Today's World" at a LASL colloquium in April. Ramey is a past president of the Association of Women in Science.

Among Our Guests

Vivian Hewitt, president-elect of the Special Libraries Association, receives a tour of LASL's library from Art Freed and Lois Godfrey. Hewitt, who is librarian of the Carnegie Endowment for International Peace in New York City, is touring New Mexico.

A group of Soviet scientists visited CTR projects as part of their tour of LASL, following the Fifth U.S.-U.S.S.R. Committee Meeting on Atomic Energy in Washington, D.C. The 13-member delegation was in Los Alamos April 11-12.



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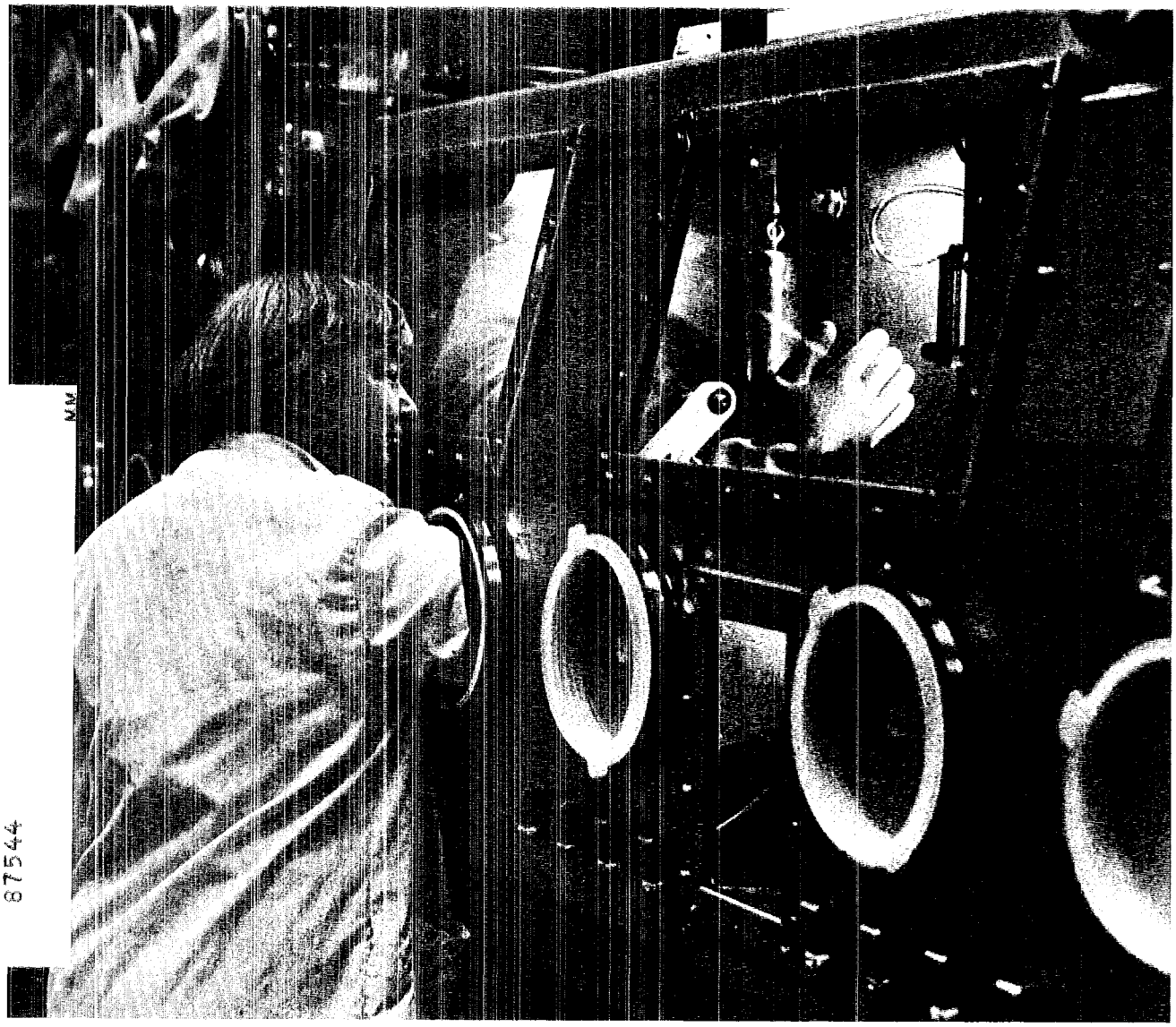

Dixy Lee Ray, governor of Washington and former chairman of the Atomic Energy Commission, visited LASL recently, and in this photo tries on gloves in glove boxes in the Laboratory's new plutonium handling facility.